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NAVY PUBLIC WORKS CENTER
NORFOLK, VIRGINIA
UTILITIES

STANDARD OPERATING PROCEDURE / JOB HAZARD ANALYSIS

TITLE

SHORE POWER CABLE ASSEMBLY

PROCEDURE NUMBER

623 ELE 13

SIGNED:_____

(DATE)

APPROVED:_____

(DATE)

SAFETY PROFESSIONAL:_____

(DATE)

MANAGEMENT OFFICIAL:_____

(DATE)

REVISION **A**

SHORE POWER CABLE ASSEMBLY

DISTRIBUTION

CODE	REV/DATE	REV/DATE	REV/DATE	REV/DATE	REV/DATE	REV/DATE	REV/DATE
620							
622							
610							
610.E1							
601A							
30A							
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216							
226							
236							
622.5							

REVISIONS

REV	DESCRIPTION	SIGNATURE	DATE
A	Initial Issue.	David Midgett	5/23/96

SHORE POWER CABLE ASSEMBLY

Purpose:
Procedure test and install CAM-LOK connectors on new THOF, 500 KCMIL, shore power cable.

Tools and PPE:
Tools: Megaohmeter, microhmeter, hydraulic cable crimper, heat gun, vulcanizing platens, blade. PPE: Leather work gloves, safety shoes, and back brace if required to wear one by Back Injury Control and Prevention Program.

References:
1. PWCNORVAINST 5100.33D SAFETY MANUAL
2. CAM-LOK ENGINEERING BULLETIN NO 87
3. MIL-C-915/6J CABLE, POWER ELECTRICAL 600 VOLTS FOR OUTBOARD USE ONLY, TYPE THOF 500 MCM
4. MILITARY HAND BOOK 1025/2
5. NAVAL SEA SYSTEMS COMMAND, ELECTRIC PLANT INSTALLATION STANDARD METHODS, SHORE POWER INSTALLATIONS, SHIP-OR SHORE POWER IN-LINE CONNECTORS MIL-C-24368/4
5. DURALINE ASSEMBLY PROCEDURE FOR SHIP-TO- SHORE CABLES & PREP.
6. REFERENCE DRAWINGS

Procedure:
WEAR LEATHER WORK GLOVES THROUGHOUT THE PROCEDURE AS WORK PERMITS.

1. Set temperature of the top and bottom vulcanizing platens to 285 to 300 degrees F by manually adjusting temperature control knobs. Allow one hour warm-up time to stabilize temperature controls and platens.

2. Perform a 1000 VOLT insulation resistance testing on the CAM-LOK insulators. Attach test leads 1" apart. CAMLOK'S WITH VALUES LOWER THAN 100 MEGAOHMS SHOULD BE TURNED OVER TO BE REPLACED BY THE MANUFACTURER.

3. Perform a 1000 VOLT phase-to-phase and phase-to-ground meg-ohm test. NOTE: New cable with readings below the following values shall be reported to the shore power supervisor:

LENGTH	MEGAOHMS	LENGTH	MEGAOHMS
50'	2000	125'	800
165'	600	250'	400

4. Perform continuity test with micro-ohm-meter. Set meter to "10 amp" scale and measure each conductor resistance end to end. Readings shall be less than the following values:

LENGTH	OHMS	LENGTH	OHMS
50'	0.125	125'	0.325
165'	0.425	250'	0.625

5. Place the cable on work bench in cable holding vise. Measure 36" from the cable end, and mark the cable jacket with a white grease pencil. Make an angular cut on the outer jacket, and encircle the cable. Remove and throw away the outer jacket. Cut and throw away all material from the cable ends to the crotch area. CAUTION: USE EXTREME CARE WHEN REMOVING OUTER CABLE JACKET AS NOT TO INJURE YOURSELF OR DAMAGE THE CONDUCTOR INSULATION.

6. Remove the cloth covering from the cable legs that identify the three phases(if applicable). Take a six (6) inch strip of phasing tape, and mark each of the legs with the appropriate tape(if applicable). Mark phase A with black tape. Mark phase B with white tape. Mark phase C with red tape.

NOTE: If the cable assembler installs the crotch boot first, then refer to steps 20 and 21 at this point.

7. Strip the EPR insulation back (1 3/4) inches plus or minus 1/8" from conductor end on all three phase legs. DO NOT cut the strand wires of the conductor.

8. Crimp the cam-lok connector three (3) times starting 3/16 inch from the closed end of the connector. Use a Thomas and Betts 12,000 lb. head hydraulic crimp pump with a TB *87H crimp. The hydraulic crimp pump is equipped with an automatic pressure cut off to stop the crimping process when a full 10,000 psi. crimp has been applied.

9. Remove the crimped unit from the head assembly and repeat the same process on the other two legs of the cable.

10. Rough cable insulation from the CAM-LOK body four (4) inches back on the insulation to create a good surface to bond the rubber. Apply half-lapped layers of "uncured vulcanizing tape" around the barrel to build barrel diameter up to collar diameter and six inches onto the conductor insulation. Stretch the tape while applying to ensure a tight wrap.

11. Rough-up the inside of the CAM-LOK insulator sleeve two (2) inches. Spray the rear inside of the CAM-LOK insulator sleeve with Spray Lube 70 or equal. Line up the pin on the CAM-LOK with the indented portion of the CAM-LOK insulator sleeve and pull the sleeve onto the metal portion of the CAM-LOK. The CAM-LOK will "POP" into place when done correctly.

12. Visually inspect the metal to rubber fit, by looking at the front end of the CAM-LOK assembly. The male end should protrude out of the front of the CAM-LOK by approximately 1/2 inch. When checking the female end, they should both fit flush.

13. Connect either a male or female test connector in each of the connectors completed in this assembly to test for proper fit.

14. Put the CAM-LOK into the proper metal stop and rough-up the outside of the insulator sleeve two and quarter inches 2 1/4" from the cable end.

15. Using vulcanizing tape, wrap three half-lapped layers onto the rear portion of the CAM-LOK insulating sleeve and onto the layer of tape that is protruding from the inside of the sleeve. These layers should each be approximately five (5) inches long.

16. Spray the CAM-LOK vulcanizing mold with Camie 888 silicon spray or equal. Ensure that the mold platen is hot. Place ends of the cable with the stop into the mold, a position the arm in the center of the cap and tighten mold completely.

17. Repeat this procedure on the other two legs. Cook in the molds for twenty to thirty minutes. Remove from molds and take off the end stops.

18. Allow assembly to cool. Repeat cable testing as described in steps 3 and 4 of page 1 and record information on the "CABLE ASSEMBLY FORM".

19. Wipe the conductor insulation with a clean wiping cloth. Start applying #88 tape at the crotch boot break out. Stop the #88 tape on the CAM-LOK insulator sleeve. Apply 2 wraps. Repeat for other phases.

20. Rough up an area of the outer cable jacket seven (7) inches below the top of the crotch. Slide the heat-shrink crotch over the cable legs and pull completely down onto the crotch area.

21. Using a hand held heat gun, shrink the heat-shrink crotch onto the cable. Continue applying heat to the crotch until no further shrinkage is noted. After the heat-shrink crotch is shrunk in place, allow the crotch boot to cool before moving. Excessive movement of the heat-shrink crotch while hot may cause deformation or an inadequate seal.

END